Table 10 Summary of packet loss classification using offline training at end-systems of the network

Ref.	ML Technique	Network	Dataset	Features	Classification	Evaluation	
						Settings	Results
Liu et al. [282]	Unsupervised: · EM for HMM	Hybrid wired and wireless	Synthetic data: · ns-2 simulation · 4-linear topology Data distribution: · Training = 10*k*	· Loss pair RTT	· Congestion loss · Wireless loss	· 4-state HMM · Gaussian variables · Viterbi inference	HMM accuracy[a]: · 44 — 98%
Barman and Matta [38]	Unsupervised: · EM for HMM	Hybrid wired and wireless	Synthetic data: · ns-2 simulation · Topology: - 4-linear - Dumbbell	· Loss pair delay · Loss probabilities: - Congestion - Wireless *(nw)* *nw: network support*	· Congestion loss · Wireless loss	· 2-state HMM · Gaussian variables · Bayesian inference · Discretized values: - 10 symbols	HMM accuracy[a]: · 92 — 98%
El Khayat et al. [129, 130, 163]	Supervised: · Boosting DT · DT · RF · Bagging DT · Extra-trees · MLP-NN · *k*-NN	Hybrid wired and wireless	Synthetic data: · Simulation in: - ns-2 - BRITE · > 1*k* random topologies Data distribution: · Training = 25*k* · Testing = 10*k*	40 features applying avg, stdev, min, and max on parameters: · One-way delay · IAT And on packets: · 3 following loss · 1 before loss · 1/2 before RTT [130] *finds that adding the number of losses is insignificant*	· Congestion loss · Wireless loss	Ensemble DT: · 25 trees NN: · 40 input neurons · 2 hidden layers with 30 neurons · 1 output neuron · LMA[b] learning *k*-NN: · *k* = 7	AUC (%)[c]: · 98.40 · 94.24 · 98.23 · 97.96 · 98.13 · 97.61 · 95.41
Fonseca and Crovella [150]	Supervised: · Bayesian	Wired	Real data: · PMA project · BU Web server	· Loss pair RTT	· Congestion loss · Reordering	· Gaussian variables · 0 to 3 historic samples	In PMA: · TPR = 80% · FPR = 40% In BU: · TPR = 90% · FPR = 20%
Jayaraj et al. [214]	Unsupervised: · EM for HMM · EM-clustering	Optical	Synthetic data: · ns-2 simulation · NSFNET topology Data distribution: · Training = 25*k* · Testing = 15*k*	· Number of bursts between failures	· Congestion loss · Contention loss	HMM: · 8 states · Gaussian variables · Viterbi inference · 26 EM iterations Clustering: · 8 clusters · 24 EM iterations	CV[c]: · 0.16 — 0.42 · 0.15 — 0.28 HMM accuracy[a]: · 86 — 96%

[a]Varies according to HMM prior estimates and network simulation settings (e.g. loss rate, error model, delay, traffic)
[b]Levenberg-Marquardt Algorithm (LMA)
[c]Respectively to the list of elements in the column ML technique